



## Determination of pure beta emitters using LSC for characterisation of waste from nuclear decommissioning

Hou, Xiaolin

*Published in:*

Book of abstracts - Advances in Liquid Scintillation Spectrometry

*Publication date:*

2013

*Document Version*

Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

*Citation (APA):*

Hou, X. (2013). Determination of pure beta emitters using LSC for characterisation of waste from nuclear decommissioning. In *Book of abstracts - Advances in Liquid Scintillation Spectrometry* (pp. 56-57). Universitat de Barcelona.

---

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

# Determination of pure beta emitters using LSC for characterization of waste from nuclear decommissioning

Xiaolin Hou

Center for Nuclear Technologies, Technical University of Denmark, Risø Campus,  
4000 Roskilde, Denmark

Corresponding author e-mail:xiho@risoe.dtu.dk

## Abstract - 16

With increasing numbers of nuclear facilities, especially nuclear power reactors, being closed in recent years and from now on, a considerable work is going to be carried out all over the world for decommissioning these nuclear facilities. For this purpose, characterization of various wastes from decommissioning is required for evaluation of the radioactivity inventory in various materials and decision making for management of the produced waste. This is carried out by quantitative determination of various radionuclides present in the materials.

The neutron activation products of components and impurity in the materials used in the nuclear facilities are the main contributors to the total radioactivity, especially in the construction materials. But long-lived radionuclides are the major concern in view of decommissioning and waste depository. Among these radionuclides, determination of pure beta emitters is the major challenges, because they could not be measured without separation from the matrix of the samples and from all other radionuclides, this entitles them as the radionuclides of difficult to measure. Liquid scintillation counting(LSC) is the most convenient and effective method for the measurement of these radionuclides after chemical separation.

In the past few years, our laboratory has developed a series of radiochemical analytical methods aiming at characterization of various decommissioning waste by determination of various radionuclides of difficult to measure. This presentation gives an overview of these analytical methods with some examples including (1) rapid determination of tritium and  $^{14}\text{C}$  in solid materials, such as graphite, concrete, steel, aluminium, paint, silica gel, soil, and dust; (2) determination of  $^{14}\text{C}$  in high tritium samples, such as heavy water, waste water, and oil; (3) determination of  $^{36}\text{Cl}$  and  $^{129}\text{I}$  in graphite, steel, concrete, waste water, and dust; (4) determination of  $^{41}\text{Ca}$  and  $^{90}\text{Sr}$  in concrete; (5)

determination of  $^{55}\text{Fe}$  and  $^{63}\text{Ni}$  in graphite, concrete, steel, aluminum, sediment, sand, waste water, seawater, and lichens. The main problems and challenges in the LSC measurement of these radionuclides and improvement in source preparation and instrumental calibration and correction will be highlighted.

### Notes:

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

# LSC 2013

ADVANCES IN LIQUID SCINTILLATION SPECTROMETRY

**18th-22nd March 2013, BARCELONA, SPAIN**

University of Barcelona  
Faculty of Chemistry  
Dept. Analytical Chemistry

**BOOK OF ABSTRACTS**



Universitat  
de Barcelona

**B:KC**